Communication-based Swarming for Flying Robots

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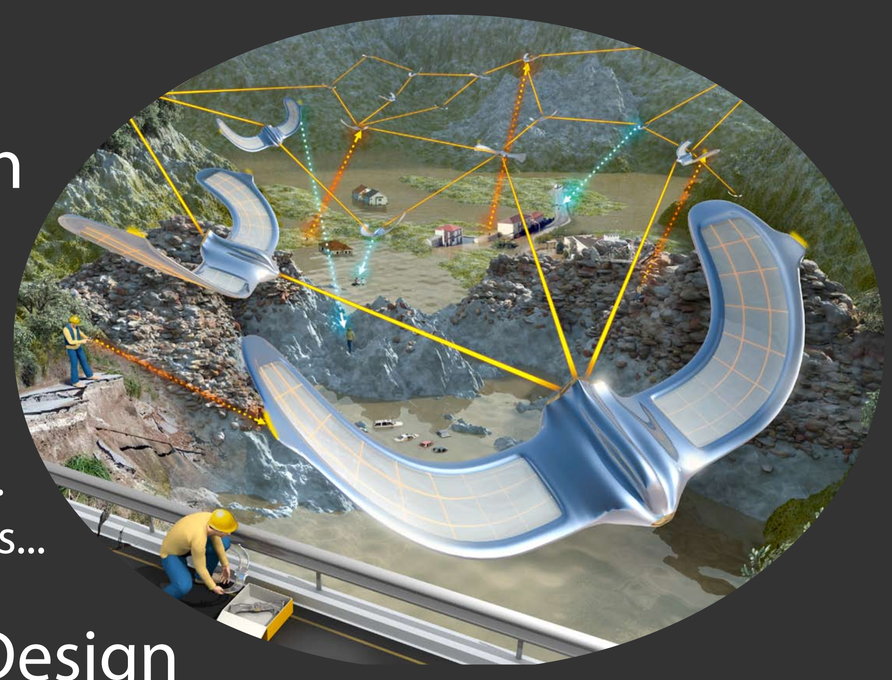
Application

Create emergency communication networks using swarms of flying robots.

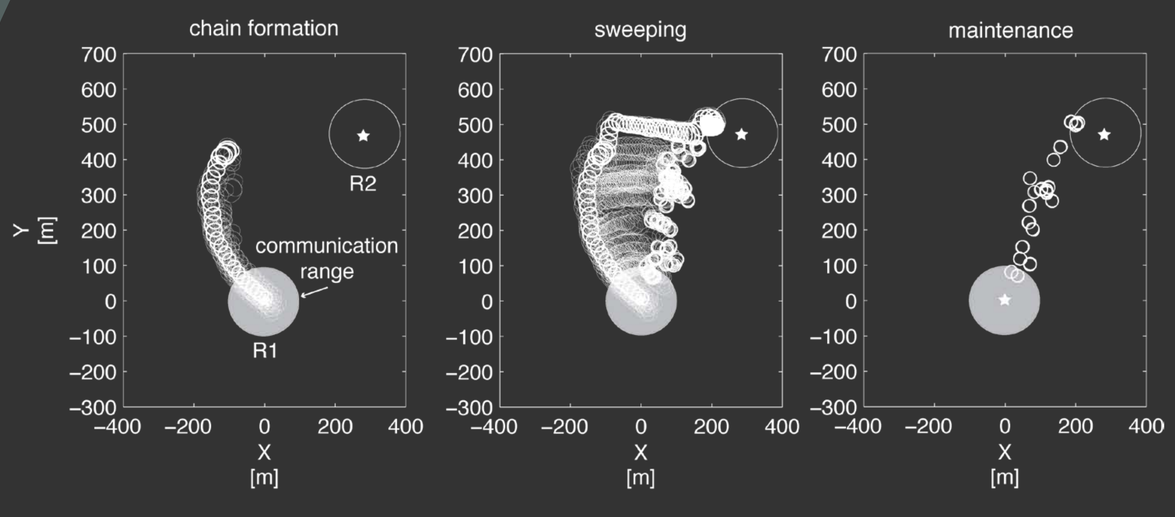


Minimalist Approach

Robot behaviors react to communication.
No GPS, cameras, radars...

Controller Design

There exists no methodology to design robot controllers that result in the emergence of desired swarm behaviors. Here, we propose two bio-inspired techniques to overcome this problem.



Artificial Evolution

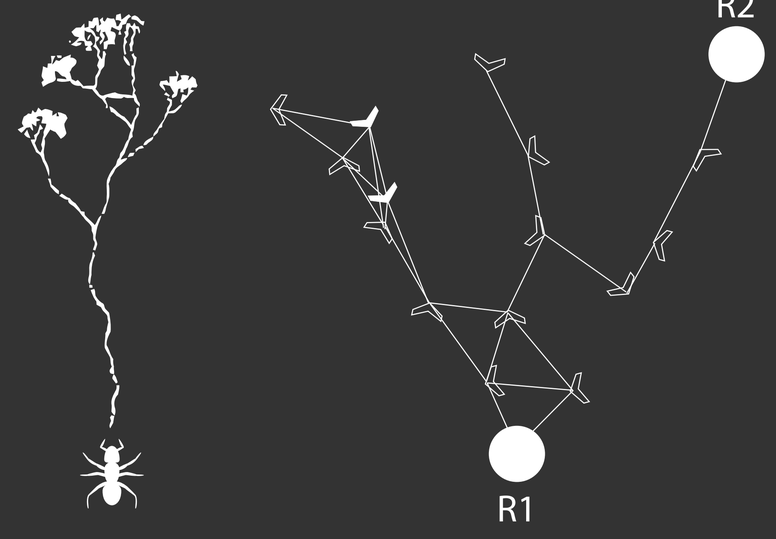
Automatically design swarm controllers that are simple, efficient and unthought of by a human designer.

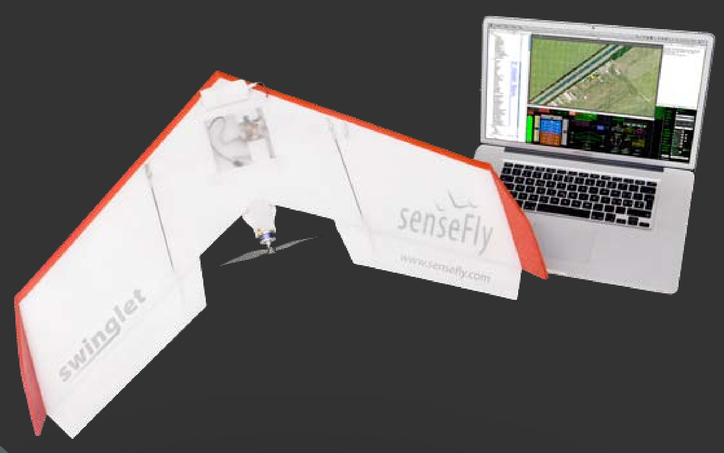
Reverse Engineering

Implement behaviours discovered though evolution in hand-designed controllers that are well understood.

Ant-based Swarming

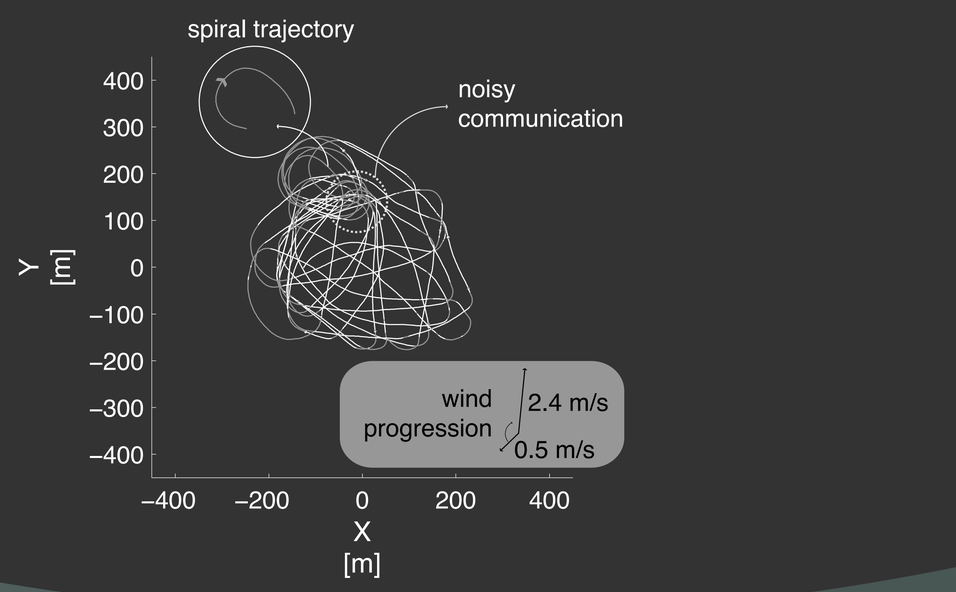
Design robot controllers based on the deployment, maintenance and evaporation of pheromone trails in nature. Pheromone is virtually deposited on neighboring robots through communication.





Reality

Adapt controllers found in simulation to a real swarm of 10 robots made by sensefly (www.sensefly.com).



FLYING ROBOTS
COMMUNICATION NETWORK
WIRELESS
SWARM

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

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